

## Original Article

Process Standardization of *Rasamanikya*

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## Abstract

*Rasamanikya* is a famous drug, frequently used by Ayurvedic physicians for *Vata-Kaphaja* diseases like *Shwasa*, *Kasa* and *Kushtha* (Skin disorders). Various methods of preparation have been found described in *Rasa* classics. Generally it is prepared by *Shuddha Haratala* which is kept between two thin transparent *Abharaka Patra* (mica sheets) in small scale and in *sharava* for large scale, heated up to desired level. There are so many methods and different liquid media have been found described for *Shodhana* of *Haratala*. Therefore the methods of preparation of *Rasamanikya* and *Shodhana* process of *Haratala* have been validated through various experiments. *Tankana*-treated *Haratala* (T.Treated) is found best for *Shodhana* process and final product too i.e. *Rasamanikya* in terms of pharmaceutical standards i.e. Ruby in colour, along with reproducibility of fixed quality.

**Key words:** *Shodhana*, Validation, T-Treated *Haratala*.

## Introduction

*Rasamanikya* has been first described in *Rasendra Chintamani* by *Dhundhukanath*<sup>3</sup> in 13<sup>th</sup> century A.D. as “*Rasam Manikya Prabham*” which directly indicates the standard of finished product i.e. Ruby colour. The same product has been described by *Krishnamram Bhatt* in *Siddha Bhesaja Manimala*<sup>5</sup> as *Kumuda Rasa*. The product of *Kupipakva* method of preparation i.e. *Tala Manikya* also was one of the synonym called *Rasamanikya*. This product is one of the familiar medicaments used throughout India by Ayurvedic physicians for various disorders including *Jwara*<sup>5</sup> (Fevers), *Kasa* (Cough), *Shwasa* (Dyspnoea), *Arshas* (Piles), *Bhagandara* (Fissures), *Nadi Vrana* (Chronic wounds) and *Kushtha*<sup>4</sup> (skin ailments), with different *Anupanas*<sup>2</sup> in various dosage forms. *Haratala*, one of the Arsenical raw materials emphasized since *Samhita* period<sup>8,9</sup> turns into ambrosia after *Shodhana* processes and manufacturing techniques. This requires proper care, critical understanding and computed technology to get the desired character of *Rasamanikya*.

Standardization of *Rasaushadhies* can be defined with the number of processes, involved in the production of a drug. The standard protocols mentioned in the classics<sup>7</sup>, which

may be applied to the present manufacturing scientific pharmaceutical ambience, such as quality of raw materials<sup>1</sup> to be taken for the process. The process standardization protocols are like temperature, time space, instrument and heating devices etc. along with purification protocols like number of *Bhavana*<sup>4</sup>, *Swedana*<sup>6</sup> etc. and the finished drug protocol<sup>2</sup> viz colour, fineness, safety profile, bioavailability and therapeutic efficacy etc. Validation<sup>13,14</sup> of the method of preparation is to be done by manufacturing the same product by similar method and instrumentation, for any number of times, with standard raw material getting output of same product with specification of parameters. The analysis of the raw material (*Ashuddha Haratala*), intermediate (*Shodhita Haratala*) and finished product (*Rasamanikya*) in terms of percentage of Arsenic and Sulphur etc.as compared with standard parameters, was carried out in same respect.

## Aims and Objective

- To develop standard product (*Rasamanikya*) as per classical parameters.

## Material &amp; Methods

The Media for *Shodhana* like *Kushmanda*, *Dadhy amla*, *Kanji* etc. various heating devices like gas burner, electric muffle furnace etc. and instruments along with other accessories used as per (Table 1).

*Methods for Shodhana:* *Shodhana* of *Haratala* was done by adapting following procedures as unit process.

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**Bhavana** (Wet-Trituration): It is a process in which the drug material is taken in a *Khalva Yantra* and the liquid material is added to it slowly up to *Rasapankawat* stage (semi solid) and then it is triturated till dryness. The process is repeated for 1 or 3 or 7 or more times as per reference.<sup>2,4</sup>

**Kshipta** (submerging in media): *Kshipta* is a process in which the drug material is kept in the media for one day (24 hours) or more as per reference, which is to be changed every day by adding the fresh media and this repeated for 3 or 5 or 7 days.<sup>2,4</sup>

**Swedana** (Heating under liquid bath) - *Swedana* is a process in which the substance is placed in a cloth which should be four-folded and made into *Pottali*. Then it is hanged with a glass rod in a pot in such a manner that it should not touch any side and remain suspended in centre. It is known as *Dola Yantra* which is filled with liquid media and subjected to mild heat up to prescribed duration.

Following liquid media were taken for *Shodhana*-

*Churnodaka*<sup>11</sup> (limewater<sup>12</sup>), *Kushmanda Swarasa* (juice of *Benincasa Hispida*), *Shalmali Kwatha* (Decoction of *Salmalia malabarica*), *Tilakshara Jala* (Alkaline water of *Sesamum indicum*) and *Kanji + Churnodaka* (T. method) (Sour gruel and limewater)<sup>1</sup>.

Total six methods were adopted for the preparation of *Rasamanikya* including *Sarava Samputa* (*Antardhuma*), *Open Sharava Samputa*, (*Bahirdhuma*), Mica sheets

(*Open air method*), Fuse bulb method along with modified heating device pattern i.e. blow lamp method (*Modified Vankanala*<sup>2</sup>) and *Kupipakwa*<sup>11</sup> method, also used to benefit present scientific and technological advancement with the control on temperature pattern and duration of heat as mentioned above.

## Results

### Lime water (After purification of Hartala)

Physical appearance was Pale yellow solution with suspended particles, smell of Hydrogen Sulphide H<sub>2</sub>S having Ash value 0.58 % w/w, test for Arsenic (Reinsch Test) positive and in Qualitative analysis of ash following Cations were present viz., Fe, Ca, Mg, Na and CO<sub>3</sub>, SO<sub>4</sub>, Cl, S, AsO<sub>4</sub> Anions were present. Analysis of Ash value, Arsenic content and free sulphur of samples of *Ashuddha Haratala*, *Churnodaka* treated *Haratala*, T-treated *Haratala*, Residue (T-treated), *Churnodaka* treated *Rasamanikya* (Mica), T-treated *Rasamanikya* (Mica) and T-treated *Rasamanikya* (*Kupi*) were carried out. Results are shown in Table 3.

### Methods of preparation of Rasamanikya

In preparation of *Rasamanikya* by Mica sheets, Blow lamp and Fuse bulb loss was 5%-10% on an average where as in *Kupipakwa* method loss was minimum i.e. 2.5%. Time consumed and remarks are shown in Table 5. General observation of yield of *Rasamanikya* with various media are shown in Table 6.

**Table 1: Material, Media and Accessories required for Shodhana & preparation of Rasamanikya**

Media for Shodhana	Heating Device	Instrumentation / Accessories
• <i>Churnodaka</i>	• Gas stove	Vessels, Sand Bath, Earthen
• <i>Kushmanda Swarasa</i>	• Blow lamp (Modified Vankanala)	Sharavas, Amber Glass, Cloth,
• <i>Dadhi, Amla</i>	• Chulika	Thread, Mica sheets, fuse bulb, Knife,
• <i>Kanji</i>	• Electric heater	HOLDERS, Clips, Iron rod, torch light,
• <i>Nimbu Swarasa</i>	• Electric Muffle Furnace	Spoons
• <i>Tankana</i>		

**Table 2: Different Method of Preparation of Rasamanikya**

Scholars / Methods	<i>Sarava Samputa</i> ( <i>Antardhuma</i> )	<i>Open Sharava Samputa</i> ( <i>Bahirdhuma</i> )	Mica sheets (Open air method)	Fuse bulb method	<i>Kupipakwa</i> method
1. Harish Anadkat <i>et.al.</i>	Sand bath on Chulika	Chulika	Chulika	–	Chulika
2. D.K.Mishra <i>et.al.</i>	Sand bath on gas stove	Gas stove	Gas stove	Gas stove	Gas stove
3. K. Srimannarayana <i>et.al.</i>	Sand bath on electric heater	Electric Heater	Gas stove, Blow lamp method (modified Vankanala)	Gas stove	Electric Muffle Furnace

**Table 3: Results of quantitative chemical analysis**

Sr. no.	Samples	Parameters		
		Ash value (w/w)	Arsenic (w/w)	Soluble extract of Carbon disulphide (w/w)
1	Ashuddha Hartala	0.05	57.95	Nil
2	Churnodaka treated Haratala	0.034	57.95	Nil
3	T-treated Haratala	0.83	58.01	0.10
4	Residue (T-treated)	37.98	16.71	0.09
5	Churnodaka treated Rasamanikya (Mica)	1.12	56.53	Nil
6	T-treated Rasamanikya (Mica)	60.95	Nil	
7	T-treated Rasamanikya (Kupi)	54.74	Nil	

**Table 4: Results of Shodhana with various Procedures and Media**

Media	Process	Loss	pH Before	pH After	Colour
Lime water	Swedana	2%	11	9	Cream
Kushmanda Swarasa	Swedana	5%	6	6.5	Slight creamy
T-treated	Swedana	1.5%	6	7.5	Golden yellow
Shalmali Kwatha	Swedana	3%	5.5	6	Greenish yellow
Dadhyamla	Kshipta	-	2	3	Slight whitish
Kushmanda Swarasa	Kshipta	-	6	6.5	Creamy
Dadhyamla	Bhavana	-	2	-	-
Kushmanda Swarasa	Bhavana	-	6	-	-

**Table 5: Results of Rasamanikya prepared by different methods with respect to time duration & loss**

Method	Loss	Time	Remarks
Mica sheets	6%	6 min	Tilt the product for uniformity
Blow lamp	5.5%	4-5 min	Tilt the product for uniformity
Fuse bulb	10%	6-7 min	Keep fuse bulb for total melting
Open Sharava	15%	½ hour	Self cooling for 20 min
Antardhuma (Electric heater)	13%	1-1½hour	Sand bath and heating device require time and temp range (3-6 hours)
Kupipakwa	2.5%	33 min	Shalaka test done for melting of product, then heating should be stopped

**Table 6: Results of Rasamanikya prepared with various media**

Media	Colour of Shuddha Haratala	Rasamanikya colour
Churnodaka	Dull yellow	Blackish red
Kushmanda Swarasa	Yellow	Dark red
Shalmali Kwatha	Greenish yellow	Blackish
Kushmanda Dadhi Kshipta	Dull yellow	Bright red
Kushmanda Dadhi Bhavita	Dull yellow	Blackish/Slight reddish
Tankana treated	Bright yellow	Bright ruby colour

**Table 7: Different media used, Shodhita Haratala and yield of Rasamanikya**

Media	Wt. of Shodhita Hartala	Finished product (yield of RM)	% loss
Churnodaka	92 gm	88 gm	5
Shalmali Kwatha	56 gm	52 gm	8
T-treated	150 gm	140 gm	7
Kushmanda Swarasa	65 gm	60 gm	8
Dadhi+K. Swarasa (Kshipta)	100	95	5
Dadhi+K. Swarasa (Bhavita)	100	90	10

## Discussion

*Grahya Lakshanas* of *Patra Haratala* as per the classics has been taken as Qualitative Protocols viz. authentication of raw material - *Patra Haratala*, Chemical configuration -  $As_2S_3$ , Colour -(Swranabhavm) Golden Yellow, Texture - (*Bhupatrakam*) with layer, Weight -(*Guru*) heavy.

Based on characteristics of purified *Haratala*, the limewater treated *Haratala* and other methods of purification as said to be well and good. The marker of purification is said to be quality of finished product i.e. *Rasamanikya*. Various colour obtained after *Shodhana* and preparation of *Rasamanikya* varied with different media.

Results of *Shodhana* by *Swedana*, *Kshipta* and *Bhavana* processes of various media were shown in Table 4. *Shodhana* by limewater and *Kushmanda Swarasa* showed a loss of 2% and 5% respectively and cream colour and slight cream colour of *Shodhita Haratala*. Where as a loss of 1.5% of media by T-treated and golden yellow colour of *Shodhita Haratala* was observed.

### Standard protocol of Shodhana - Swedana

Media: *Churnodaka*, *Kushmanda Swarasa*, *Shalmali Kwatha*, *Kanji*+*Churnodaka* (*Tankana* treated)

The stainless steel vessel was taken for study, which was having diameter of 15 cm diameter, height of vessel from out side 10cm,. The size of vessel, from in side (occupied) 5cm height of the media, 4 cm vacant, 12 cm diameter. It was heated on LPG stove, for 3 hours. The temperature of the liquid has been maintained 90°C - 95°C.

### Details of T method

*Ashuddha Haratala* (500 g.) was made into *yavakuta* (coarse powder) passed through 40no. mesh Added 10% of *Tankana* i.e. 50 g. by weight to it. And first wash was given with lemon juice (200 ml.) followed by second wash which was given with *Kanji* (200 ml.). The washed *Haratala* (498 g.) was transferred into a cloth and prepared in the form of *pottali*. This *pottali* was hanged in *Dola Yantra* filled with the mixture of *Kanji* and *Churnodaka* (Equal quantity i.e.1:1). Then it was heated for three hours by maintaining the temperature range of liquid at 90°C to 95°C on mild heat. After completion of heating process and Ten minutes of cooling, the *Haratala* was taken out from *Pottali* and washed with hot water to remove the residue of liquid. The obtained material was dried at room temperature weighed and stored in suitable container.

The *Shodhita Haratala* was spread between two mica sheets and closed with clips. It was then heated on LPG stove till it converts into *Rasamanikya*.

In *Kupipakwa* method, *Shodhita Haratala* was filled in a *Kupi* which was coated by three layers of mud smeared cloth and subjected to heat. During the preparation the

temperature formelting was observed 359°C and boiling at 415°C while the temperature at which product was prepared at 450°C. The colour of finished product was Ruby i.e. *Rasamanikya*. Total time consumed by E.M.F. was 33 minutes and after self cooling the *Rasamanikya* was collected from the bottle.

The mica sheet method was found cheaper and easier for less quantity i.e. only 10 gm at a time but it is not useful for pharmaceutical companies and due to same reason the fuse bulb method was also not found suitable in present context. *Antaradhuma* (sand bath) method produced good quantum of *Rasamanikya* but it is time consuming and not economical. It was also not found suitable for reproducibility of the good quality product. The Open *Sharava* method produces a lot of Arsenic vapours due to which causes exposure to the person and polluted the environment too. Thus, it is not a suitable method considering the hygienic point of view, and due to same problem the blow lamp method is also not found suitable

The *Kupipakwa* method was found best because, it produces good quality of *Rasamanikya* also supported by previous studies by Harish et al. and D.K. Mishra et al. though they have prepared it by *valuka yantra* and with *churanodaka Shodhita Haratala*. Here the *Haratala* was *Shodhita* by *Tankana* treated method and *Rasamanikya* was prepared in electric muffle furnace which is found easier and economical too.

## Conclusion

*Tankana* treated method for the *Shodhana* of *Haratala* is found better because the *Rasamanikya* prepared by it is having good quality, so it is validated qualitatively and quantitatively, The *Rasamanikya* prepared by *Kupipakwa* method stands economical, less time consuming and gives best results in terms of reproducibility.

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## हिन्दी सारांश

### रसमाणिक्य की निर्माण विधि का मानकीकरण

के. श्रीमन्नारायण, बी. जे. पटगिरि एवं पी. के. प्रजापति

रसमाणिक्य एक प्रसिद्ध औषधि है। आयुर्वेदिक चिकित्सकों के द्वारा यह वातकफज बीमारियों जैसे ज्वर, श्वास, कास, कुष्ठ (त्वक्विकार) में ज्यादातर प्रयोग किया जाता है। रसशास्त्र में इसके निर्माण की विभिन्न विधियाँ बतायी गयी हैं। सामान्यतः यह शुद्ध हरताल से बनाया जाता है जो कि, छोटे स्तर पर हरताल को अभ्रक पत्र के बीच में रखकर तथा बड़े स्तर पर शराव में रखकर, फिर गर्म करके बनाया जाता है। हरताल शोधन के लिए बहुत से द्रव द्रव्यों का प्रयोग बताया गया है। अतः विभिन्न प्रयोगों के द्वारा रसमाणिक्य की निर्माण विधि एवं हरताल की शोधन प्रक्रिया की वैधता की गयी है। इसमें टंकण के माध्यम से शोधित हरताल तथा इसी से बनाया गया रसमाणिक्य औषधि निर्माण मानक जैसे माणिक्य वर्ण की पुनरावृत्ति तथा निश्चित गुण पाये गये हैं।

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